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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/505,803	02/17/00	ARNOLD J	RA6-021400

EXAMINER
COMPTON, E

ART UNIT	PAPER NUMBER
3726	2

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
09/505,803	Arnold
Examiner	**Group Art Unit**
Eric Compton	3726

☐ Responsive to communication(s) filed on _____

☐ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claim

☒ Claim(s) *1-20* is/are pending in the applicat

Of the above, claim(s) _____ is/are withdrawn from consideration

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) *1-20* is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☐ All ☐ Some* ☒ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☒ Notice of References Cited, PTO-892

☐ Information Disclosure Statement(s), PTO-1449, Paper No(s). _____

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 17-19 are rejected under 35 U.S.C. 102(a) as being anticipated by Applicant's Admitted Prior Art (AAPA).

AAPA, as found on pages 1-16 of the specification, disclose various methods of forming (and or repairing) metal products comprising, the following steps: forming a substrate blank to near-finished dimensions, performing pre-coating treatments, coating the substrate with a protective coating, and performing post-coating treatment. Furthermore, it is disclosed that, "Turbine engine airfoil parts, such as vanes, are manufactured to precise tolerances that determine airflow characteristics for the part" (page 16, lines 4-5). Therefore, it is inherent that the dimensional changes, i.e., pre-processed dimensions versus post-processed dimensions, of the part, due to coatings or treatments must be selected precisely and monitored such that the final parts retains precise tolerances. Since, the present invention is concerned with forming a metal product, rather than repairing or restoring a damaged metal product, the dimensions can be selected up-front.

With regards to coating the metal substrate, it is disclosed that "The coating material layer is formed to build-up the metal component to desired finished dimensions and to provide the finished product with various surface attributes" (page 4, lines 11-12). Prior to coating, it is also known to provide a hot isostatic pressing (HIP) treatment to consolidate the metal powder of the casting (see pages 8-9). A protective coating is then applied, using a high-density coating process, for example a Hyper Velocity Oxyfuel (HVOF) plasma thermal spray process (see pages 6-7). Once coated, the metal part may be subjected to another hot isostatic pressing (HIP) treatment in order to eliminate porosity of the coating and optimize the polycrystalline microstructure (pages 13-15, with respect to Cetel et al, Wilson, and Gupta et al). In the case of Gupta et al, in which a substrate is coated with a metallic overlay and a high temperature corrosion resistant outer layer, the subsequent HIP treatment was performed to "eliminate porosity and creates an inter-diffusion between the outer layer, the overlay and the substrate" (page 15, lines 6-10). Therefore, it is well known in the art, as well as recognized by Applicant, to performed a HIP treatment in order to diffusion bond the coating material to the workpiece substrates.

The HIP treatment claimed by Applicant is essentially the same HIP treatment disclosed by AAPA. "HIP treatment is used in the densification of cast metal components and as a diffusion bonding technique for consolidating powder metals. In the HIP treatment process, a part to be treated is raised to a high temperature and isostatic pressure. Typically, the part is heated to 0.6 - 0.8 [60 - 80%] times the melting point of the material comprising the part, and subjected to pressures on the order of 0.2 to 0.5 [20 - 50%] times yield strength of the material. Pressurization

if achieved by pumping an inert gas, such as Argon, into a pressure vessel. Within the pressure vessel is a high temperature furnace, which heats the gas to the desired temperature. The temperature and pressure are held for a set length of time, and then the gas is cooled and vented" (see pages 8-9, lines 17-6).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-16 and 20, are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant's Admitted Prior Art (AAPA) in view of US Patent 5,156,321 to Liburdi et al

AAPA, discloses the invention as cited above. AAPA, further mentions sintering treatments in the forming metal products. However, AAPA does not specifically disclose performing a sintering treatment before performing a HIP treatment, after the step of coating a metal substrate.

Liburdi et al disclose a method of repairing metal articles. A component is first subjected to a sintering process to prepare the surface. The coated is then coated with a braze alloy. "After the application of the braze alloy, the component is placed under vacuum or in an inert or reducing atmosphere and heated to a temperature similar to that used for partially s cycle,

typically in the range of 800° - 1600°C [1472° - 2912°F], preferably 1000° - 1400°C [1832° - 2552°F]. The temperature is selected to be such that the low melting braze will be liquid, and wet the surfaces of the pores in the previously sintered area. The component is held at temperature for a sufficient interval to promote liquid phase sintering, typically 20 minutes to 24 hours. ***Liquid phase sintering is the process by which adjacent particles in a powder mass are consolidated principally by diffusion through a liquid phase present between the particles.*** The component or fabrication is then cooled to room temperature. The component is then given a suitable heat treatment to develop mechanical properties in the joint and the base metal. ***Hot isostatic pressing can be used as part of the heat treatment to close any minor internal porosity.*** Hot isostatic pressing is the process of simultaneously exposing the component to high pressure (10-50 KSI) and temperature greater than 1000 °C [1832°F]" (col 4, lines 12- 34).

Regarding claims 1, 9, 13, and 20, it would have been obvious to one of ordinary skill in the art, at the time of invention, to have performed a sintering treatment before performing a HIP treatment of AAPA, in light of the teachings of Liburdi et al, in order to better consolidated the coating and increase diffusion between the coating and substrate.

Regarding claims 2, 10, and 15, Liburdi et al disclose that turbines parts are manufactured from nickel and cobalt-based superalloys (col 1, lines 10-12). AAPA discloses that it is known to apply coating by a hyper velocity oxy-fuel (HVOF) thermal spray process, in the manufacture of turbine parts.

Regarding claims 3, 7, and 14, Liburdi et al disclose that the step of sintering heat treatment is performed at a temperature in the range of 800° - 1600°C [1472° - 2912°F], preferably 1000° - 1400°C [1832° - 2552°F], typically 20 minutes to 24 hours.

Regarding claims 4, 8, and 12, both AAPA and Liburdi et al disclose HIP treatments. Liburdi et al noted that the hot isostatic pressing is performed at a high pressure (10-50 KSI) and temperature greater than 1000 °C [1832°F].

Regarding claims 5 and 11, AAPA discloses, that "HIP treatment is used in the densification of cast metal components and as a diffusion bonding technique for consolidating powder metals. In the HIP treatment process, a part to be treated is raised to a high temperature and isostatic pressure. Typically, the part is heated to 0.6 - 0.8 [60 - 80%] times the melting point of the material comprising the part, and subjected to pressures on the order of 0.2 to 0.5 [20 - 50%] times yield strength of the material. Pressurization if achieved by pumping an inert gas, such as Argon, into a pressure vessel. Within the pressure vessel is a high temperature furnace, which heats the gas to the desired temperature. The temperature and pressure are held for a set length of time, and then the gas is cooled and vented" (see pages 8-9, lines 17-6).

Regarding claims 6, and 16, Liburdi et al disclose that both the sintering layer and the braze coating match the composition of the metal substrate. AAPA discloses that "The coating material layer is formed to build-up the metal component to desired finished dimensions and to provide the finished product with various surface attributes" (page 4, lines 11-12).

Double Patenting

5. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

6. Claims 1-20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-31 of U.S. Patent No. 6,049,978. Although the conflicting claims are not identical, they are not patentably distinct from each other because the essentially the same method(s) is/are being claimed.

7. Claims 1-20 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-22 of U.S. Patent No. 5,956,845. Although the conflicting claims are not identical, they are not patentably distinct from each other because essentially the same method(s) is/are being claimed.

Prior Art References

8. The prior art references listed on the enclosed PTO-892, but not used in a rejection of the claims, are cited for their teachings of methods for forming a metal part.

The references cited by US Patent 6,049,978 and 5,956,845 to Arnold have been considered but are not cited. Applicant, is reminded of a duty to disclose, and is recommend to submit an IDS citing those references.

Contact Information

9. Official documents related to the instant application may be submitted to the Technology Center 3700 mail center by facsimile at (703) 305-3579/3580. Should Applicant desire to submit a DRAFT response to the Examiner by facsimile transmission, then Applicant should contact the Examiner at the number below for instructions concerning the transmission of DRAFT documents. Applicant is reminded to clearly mark any facsimile transmission as "DRAFT" if it is not to be considered as an official response.

10. Any inquiry concerning this communication should be directed to Examiner Eric Compton at telephone number (703) 305-0240.

P. W. Echols
Primary Examiner

ebc
April 8, 2001